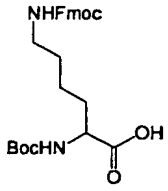
What is claimed is:

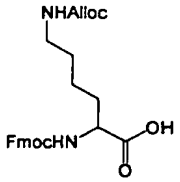
1. A method for producing a functional PNA oligomer comprising: synthesizing a PNA oligomer by reacting a PNA monomer unit having adenine, guanine, cytosine or thymine protected by a protecting group with Boc-lysine(Fmoc)-OH according to general formula (I) (wherein Fmoc represents 9-fluorenylmethoxycarbonyl) or Fmoc-lysine(Alloc)-OH according to general formula (II) (wherein Fmoc represents 9-fluorenylmethoxycarbonyl, Boc represents t-butoxycarbonyl, and Alloc represents allyloxycarbonyl), followed by introducing a functional molecule having a free carboxylic acid into said PNA oligomer and de-protecting the protecting group.

[Chemical 1]



Boc-lysine(Fmoc)-OH **(I)**

[Chemical 2]



Fmoc-lysine(Alloc)-OH **(II)**

2. The method according to claim 1, wherein a different type of functional molecule is introduced after having introduced a functional molecule.

3. The method according to any of claim 1 and 2, wherein the functional molecule to be introduced is selected from a

photoreactive functional molecule, membrane-permeating functional molecule, organ-selective functional molecule, bactericidal functional molecule, molecule-destroying functional molecule, adhesive functional molecule and molecule-recognizing functional molecule.

4. The method according to claim 2 or 3, wherein the functional molecule to be introduced contains a photofunctional molecule and a membrane-permeable functional molecule.

5. The method according to claim 4, wherein the photofunctional molecule is Cy3, Cy5, Bodipy, pyrene, naphthalimide, naphthaldiimide, FAM, FITC, ROX, TAMRA or Dabcyl, and the membrane-permeable functional molecule is a water-soluble amino acid derivative.

6. The method according to any of claims 1 to 5, wherein the protecting group that protects adenine, guanine, cytosine or thymine is a benzyloxycarbonyl group (Z group).

7. The method according to any of claims 1 to 6, wherein synthesis of PNA oligomer includes condensation and elongation in the PNA chain using solid-phase supports for the Boc method and Fmoc method.

8. The method according to any of claims 1 to 7, wherein the solid-phase support for the Boc method is methylbenzhydrylamine (MBHA) used for peptide synthesis in the solid-phase Boc method.

9. The method according to any of claims 1 to 7, wherein

the solid-phase support for the Fmoc method is MBHA, a resin in which polystyrene is chloromethylated (Merrifield resin), a Merrifield resin modified with 4-hydroxybenzyl alcohol (Wang resin), an aminomethyl resin bonded with a Boc-amino acid linker (PAM resin), an aminomethyl resin bonded with an N-Fmoc-N-methoxy linker (Weinreb resin), a resin in which p-nitrobenzophenonoxime is bonded to polystyrene (Oxime resin) or a resin that has been tritylated using polystyrene (Trityl resin).

10. The method according to any of claims 1 to 9, wherein the introduction of a functional molecule having free carboxylic acid is carried out by dehydration condensation with a primary amino group obtained by selective de-protection by piperidine treatment of an Fmoc group in the Boc method or by zinc acetate solution treatment of an Alloc group in the Fmoc method.

11. The method according to claim 2 comprising the following a) to d),
one or two or more of a) and b):

a) production of a PNA oligomer by reacting a PNA monomer unit with Boc-lysine(Fmoc)-OH in a step of introducing Boc-lysine(Fmoc)- OH into a PNA oligomer;

b) introduction of a functional molecule into a PNA oligomer is carried out by dehydration condensation with a primary amino group obtained by selective de-protection by piperidine treatment of an Fmoc group in the aforementioned step of producing a functional PNA oligomer from a PNA oligomer; and

one or two or more of c) and d):

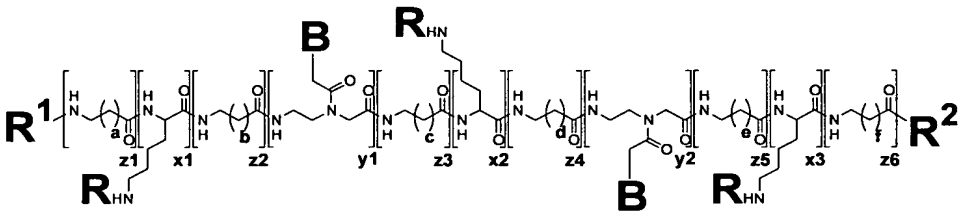
c) production of a PNA oligomer by reacting a PNA monomer

unit with Fmoc-lysine(Alloc)-OH in a step of introducing Fmoc-lysine (Alloc)-OH into a PNA oligomer; and,

d) introduction of a functional molecule into a PNA oligomer is carried out by dehydration condensation with a primary amino group obtained by selective de-protection by zinc acetate solution treatment of an Alloc group in the aforementioned step of producing a functional PNA oligomer from a PNA oligomer.

12. A compound represented by the following general formula (III):

[Chemical 3]



(III)

(wherein B's each independently represent adenine, guanine, cytosine or thymine, which may be the same or different, R's each independently represent an Fmoc group or a functional carboxylic acid derivative, which may be the same or different, R^1 represents a hydrogen atom or a functional carboxylic acid derivative, R^2 represents a derivative or a functional carboxylic acid derivative containing a hydrogen atom, an amino group, a hydroxyl group or a thiol group, a through f represent an integer from 0 to ∞, X_1 through X_3, Y_1, Y_2 and Z_1 through Z_6 all represent an integer of 0 or more, $X_1 + X_2 + X_3 \geq 0$, $Y_1 + Y_2 > 0$ and $Z_1 + Z_2 + Z_3 + Z_4 + Z_5 \geq 0$, provided that $X_1 + X_2 + X_3$ and $Z_1 + Z_2 + Z_3 + Z_4 + Z_5$ are not simultaneously 0, and in the case $X_1 + X_2 + X_3 = 0$, R^1 represents a functional carboxylic acid derivative).

13. The compound according to claim 12, wherein $X_1 + X_2 + X_3 = 3$ and $Y_1 + Y_2 = 15$.

14. The compound according to claim 13, wherein $X_1 = 3$ and $Y_1 = 15$.

15. The compound according to claim 14, wherein R or R^1 represents a cell membrane-permeable functional molecule derivative.

16. The compound according to claim 15, wherein R^1 represents a functional carboxylic acid derivative.

17. The compound according to claim 15 or 16, wherein $X_1 = Z_1 = 1$.

18. The compound according to any of claims 15 to 17, wherein $Y_1 \geq 2$ and $Z_2 = 1$.

19. The compound according to any of claims 15 to 18, wherein $a \leq 6$, $b \leq 4$ and $f \leq 6$.

20. The compound according to any of claims 15 to 19, wherein R^1 represents a photofunctional carboxylic acid derivative.